Technical Memorandum 2000-1

PRELIMINARY REVIEW OF ISSUES REGARDING DEVELOPMENT OF A STATEWIDE SALMON RECOVERY MONITORING PROGRAM

January 12, 2000

Independent Science Panel[1]

Monitoring is the fulcrum for salmonid recovery. The balance of science, effective use of resources, and policy decisions that will recover salmonids depends on scientifically valid monitoring to measure success and reduce uncertainty. To this end, the Independent Science Panel (ISP) is responsible for preparation and submittal of a report on monitoring to the Governor and Legislature that recommends specific indicators and data quality guidelines necessary to monitor the recovery of salmonids in a scientifically sound fashion. This report will be completed by December 31, 2000.[2]

Effective monitoring must address complex ecological and institutional issues. Some of these are outlined below. We believe that scientific and institutional coordination is essential. As we begin our tasks, we recognize that monitoring activities and programs are presently underway, and others are to be initiated before our report will be completed. Consequently, we wish to keep interested parties informed of our thinking as it progresses. This document describes our preliminary ideas regarding the characteristics of a scientifically valid monitoring program. We are interested in what other parties are doing with respect to monitoring in the State of Washington and intend on keeping all who are interested informed of our progress in future ISP memoranda.

BRIDGING SCIENCE AND POLICY

Adaptive Management: The statewide monitoring program is being designed to detect changes in salmon abundance resulting from both natural and anthropogenic (human-caused) actions. Such a program must be developed within an adaptive management framework in which monitoring results are used to guide future actions.

Adaptive management provides a direct feedback loop between science and management such that management/policy decisions can be modified based on new information. It assumes that management actions (we include recovery actions under this heading) are experiments, and therefore the results of such experiments can be used to alter present actions and guide future actions necessary for successful recovery of a species.

Adaptive management works most efficiently as large-scale experiments in which alterations/modifications are made to some factor, or combination of factors (e.g., physical habitat, harvest regulations, hatchery management) that are believed to be negatively impacting fish abundance. Once the actions are effected, the statewide monitoring program must be able to detect responses within a reasonable time frame, with the results providing a feedback loop used for defining necessary future actions. In

a general sense, policy statements and directions are the hypotheses that are being tested. This means that policy commitments must be large in order to effect detectable signals of biological change. For adaptive management to be effective in salmonid recovery, it will require a substantial commitment to build and maintain a credible assessment and monitoring program. It will also require the institutional arrangements to compel the use of information generated from the monitoring program.

SCIENTIFIC ISSUES

1. Types of Monitoring: The statewide monitoring program will require different types of monitoring depending on the recovery objectives. Specific types may include: (1) implementation and compliance monitoring (used to assess whether conservation actions occurred as planned, and the degree to which regulated actions are in compliance with regulatory permits, laws, etc.), (2) validation monitoring (used to test/evaluate hypotheses and conceptual models used to predict relationships between/among variables), and (3) effectiveness and trend monitoring (used to assess degree to which a given measure or activity is achieving stated objectives and changes in key conditions/parameters over long temporal scales). However, such types are not mutually exclusive, nor are they independent, and the statewide monitoring program must provide linkages between them to ensure overall coordination in data collection and dissemination of information.

2. Species Differences: Because salmonid species differ in their life history requirements and strategies, the statewide monitoring plan must be developed with consideration for and understanding of these differences.

3. Regional Differences in Monitoring Needs: Although the monitoring program will be statewide, specific monitoring elements (e.g., parameters or variables to be monitored) will likely differ regionally. Factors limiting stock recovery will be based on differences in species and stocks, watershed/habitat types, type and degree of anthropogenic influences, and resource management. The statewide monitoring plan must be flexible and sensitive to these and other regional differences, and yet be capable of detecting biological responses over a wide range and diverse assemblage of landscapes and species of concern.

4. Issues of Scale: Ecological processes happen over different spatial and temporal scales, both of which need to be factored into the development of the statewide monitoring program. Spatial scale considerations invoke the realization that monitoring needs may differ at varying levels: reach - stream - watershed - region - state. Likewise, monitoring needs will differ in accordance with varying temporal scales of recovery that depend upon species-specific demographic characteristics, and the time courses for ecological and geomorphic succession. In addition to data collection and analysis, allowance needs to be made for the integration of data across these scales, because certain problems are only detectable at a given scale and no other.

5. Duration of Monitoring Program: Duration of the monitoring period will depend upon the nature of the recovery period. Important factors are life span (generation time), the natural range of variability in physical habitat conditions, recurrence intervals of natural disturbances (floods, landslides, fires, drought) resulting in the natural cyclical, and inter-annual fluctuations that occur in salmon stocks, time needed for ecological and geomorphic succession. The monitoring program must be of sufficient intensity and duration to detect and tease out changes in fish abundance resulting from natural (e.g., climatic), density independent factors, from those resulting from human directed actions designed to benefit recovery.

6. Parameters for Monitoring: Monitoring plans should include a suite of parameters and modeling approaches that will allow an accurate depiction of the recovery pathway for each of the listed species. Each indicator or parameter must be related to an ecological process that affects fish survival, growth, and reproduction.

7. Quality Assurance/Quality Control in the Monitoring Program: The monitoring program must include separate components for ensuring the quality of the data, including protocols for data collection, data validation, data processing and analysis, and data sharing/management. Institutional issues, such as how to administer and direct this component, to ensure integrity and credibility must be addressed.

INSTITUTIONAL ISSUES

1. Monitoring Program vs. Monitoring Budget: Monitoring will be demanding of resources and identified needs will no doubt exceed financial resources available for the program. Monitoring that is finally approved and implemented should be provided with sufficient financial resources to allow it to meet clearly defined goals. Regardless, the program will require a substantial long-term (measured in generation time of salmon) commitment of financial resources.

2. Decentralized versus Central Management of Monitoring Program: The monitoring plan must define management and administrative roles and processes; i.e., data flow and data management responsibilities, reporting relationships and roles of monitoring staff etc.

3. Integration and Coordination of Existing Monitoring: Numerous monitoring programs already exist throughout the state and along the West Coast. Coordination and infusion of ideas and data from these other programs will strengthen the overall effectiveness, efficiency, and technical validity of Washington's statewide monitoring program.

OUTLINE OF ISP ACTIONS

We are beginning to outline the tasks that will lead to our preparation of a monitoring report that will be submitted to the Governor and the Washington State Legislature. In addition, we are exploring several avenues for identifying, compiling, and reviewing existing monitoring programs. These include: (1) sponsoring (perhaps jointly with the

Services) one or more monitoring workshop(s) to allow tribes, agencies, and volunteer groups the chance to describe their programs; and (2) meeting with representatives from other states, provinces, or regions who are responsible for coordinating similar programs.

Although the process of identifying recovery goals and de-listing criteria by state, tribes, and Services is just beginning, we hope to identify essential components and a framework that will be consistent with these activities.

We must emphasize that the task before the State of Washington of developing and implementing a monitoring plan that addresses multiple needs at multiple scales across the state is formidable, complex, and wrought with a myriad of both small and large technical and institutional considerations. Although we have not been given the task of developing or coordinating the implementation of such a plan, we intend on making recommendations on how to establish and maintain a credible program. We remain interested in implementation, however, because complications during development may tend to lead to compromises that would jeopardize the technical strength and integrity of an overall program, which would otherwise provide considerable support for decision-makers.

[1] Members of the Independent Science Panel include: Drs. Ken Currens (Chair), Hiram Li, John McIntyre, Dave Montgomery (Vice-Chair), and Dudley Reiser.

[2] The Independent Science Panel was formed by the Engrossed Substitute House Bill 2496, with duties further defined in Second Engrossed Second Substitute Senate Bill 5595 (Section 10).